REMARKS

Claims 1-3, 5-23 and 25-28 are pending in the present application. Claim 1 has been amended to set forth the subject matter of the invention more clearly. Reconsideration of the application as amended is respectfully requested.

Rejections Under 35 U.S.C. § 102

The Examiner rejected claims 1-3, 5, 6, 10-13, 18, 23, 25 and 28 under 35 U.S.C. §102(b) as being anticipated by Wirth et al (U.S. Pat. No. 5,270,657). The Examiner's rejections are too lengthy to be reproduced efficiently herein. Nonetheless, Applicants respectfully traverse this rejection.

Anticipation under section 102 can be found only if a single reference shows exactly what is claimed. *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 U.S.P.Q. 773 (Fed. Cir. 1985). For a prior art reference to anticipate under section 102, every element of the claimed invention must be identically shown in a single reference. *In re Bond*, 910 F.2d 831, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990). To maintain a proper rejection under section 102, a single reference must teach each and every element or step of the rejected claim. *Atlas Powder v. E.I. du Pont*, 750 F.2d 1569 (Fed. Cir. 1984).

Each of independent claims 1, 10, 18 and 23 recite similar subject matter and were rejected based on the same elements of the Wirth et al. reference. Therefore, independent claims 1, 10, 18 and 23 are discussed together.

As described in the present application, in MR imaging systems, it is desirable to maintain linear conduction of gradient current between the gradient amplifiers and the gradient coils. Failure to drive the gradient coils in the manner that closely conforms to

the applied pulse sequence may result in poor imaging performance. Accordingly, in an MRI system, a switching assembly should be capable of linearly conducting gradient currents between positive and negative values and at near-zero values. Accordingly, the present switching assembly 90 includes each of a switching device 102 and a steering circuit 104. As illustrated in Fig. 5, the switching device 102 is coupled between the drive 101 and the load 103. The steering circuit 104 is coupled in parallel with the switching device 102. As clearly stated in the description of Fig. 5, the steering circuit 104 is provided to direct the current between the drive 101 and the load 103 in the event that the switching device 102 cannot conduct current in a linear or uninterrupted manner. Thus, in applications in which linear conduction of current is a concern, the steering circuit 104 ensures that a current carrying path is provided between the drive 101 and the load 103 for the entire duration of any current flow, regardless of the magnitude of the current. To be clear, the current steering circuit 104 is coupled in parallel with the switching device to provide an alternate path between the drive 101 (e.g., amplifier 96) and the load 103 (e.g., gradient coil 42) when the magnitude of the current is below a non-zero threshold value. As best illustrated with respect to Figs. 8 and 9 of the present disclosure, as the magnitude of the current approaches zero, the switching device 102 may fail to conduct current from the drive 101 to the load 103. The steering circuit 104 is thus provided to conduct current at very low levels when the switching device 102 is in a non-conducting state.

Conversely, the Wirth et al. reference does not provide a steering circuit coupled in parallel with a switching device. The Examiner's identification of the elements in the Wirth et al. reference which are correlated with the recited elements in the present application to support a *prima facie* case of anticipation is unclear. The Examiner identifies the components 116-119 of the Wirth et al. reference as the switching device of the recited claims. The Examiner again cited components 116-119 as correlating to the steering circuit of the recited claims. Alternatively, the Examiner correlated the switching network 66 with the steering circuit recited in the present claims. Regardless

of the interpretation, it is clear that the elements recited in the present claims are not disclosed in the Wirth et al. reference.

As recited in the pending claims and as particularly described in the specification of the instant application, the switching device and the steering circuit are different, independent circuits that are connected in parallel to permit current to be supplied to a gradient coil assembly even when the switching device ceases to conduct current. It is clear that the steering circuit and the switching device comprise independent circuits that are configured to alternately conduct current depending on the current level of the input signal. Under this interpretation of the claims, the Examiner has used the same elements in the Wirth et al., reference to disclose two entirely separate elements. Accordingly, the Examiner's identification of components 116-119 as correlating to both the switching device and the steering circuit is entirely improper.

The Examiner's alternative assertion also fails to provide a proper basis for the present rejection. If the switching network 66 is correlated with the steering circuit 104, as the Examiner asserts in an alternative position, the reference still fails to disclose all of the recited elements of the present claims. The switching network 66 of the Wirth et al. reference is part of the DC power supply 46. The components 116-119 are part of the linear amplifier 44. As disclosed throughout the Wirth et al. reference, the linear amplifier 44 is connected in series with the DC power supply 46. Col. 5, lines 13-17. Each linear amplifier 44 provides a voltage output that is a simple multiplicative scaling of an analog signal. Col. 5, lines 17-19. The linear amplifier 44 has a floating output which allows the voltage output at the linear amplifier 44 to be added to other voltage sources by connecting the voltage output in series with other sources. Col. 5, lines 29-32. Accordingly, linear amplifiers 44 and DC power supplies 46 are connected in series across the gradient coil 22. Each embodiment disclosed in the Wirth et al. reference describes the series connection of the linear amplifier 44 and the DC power supply 46. Thus, even if the Examiner's assertion correlating the recited steering circuit 104 with the

switching network 66 of the DC power supply 46 was valid it is clear that the DC power supply 46 and the linear amplifier 44 are connected in series rather than in parallel as with the switching device and steering circuit recited in the present claims.

Regardless of which alternative of the Examiner's rejection is maintained, it is clear that the Wirth et al. reference does not disclose a switching circuit comprising a switching device coupled in parallel with a current steering circuit as clearly recited in each of the present independent claims. Therefore, the present claims cannot possibly be anticipated by the cited reference.

In view of the remarks set forth above, Applicants respectfully submit that the subject matter of independent claims 1, 10, 18 and 23, as well as the claims dependent thereon, is not anticipated by Wirth et al. Accordingly, Applicants respectfully request withdrawal of the Examiner's rejections and allowance of claims 1-3, 5, 6, 10, 11, 18, 23, 25 and 28.

Rejections Under 35 U.S.C. § 103

Claims 7-9, 14, 15 and 19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Wirth et al. in view of Mansfield et al. (U.S. Pat. No. 4,820,986). As discussed above, all of the independent claims are believed to be allowable over the Wirth et al. reference. The Mansfield et al. reference does nothing to obviate the deficiencies of the Wirth et al. reference with regard to the parallel circuits used to continuously supply current between an amplifier and a gradient coil or, more generally, between a source and a load. Accordingly, all of the cited dependent claims are believed to be patentable for the subject matter they separately recite as well as by virtue of their dependency on an allowable base claim. Accordingly, Applicants respectfully request withdrawal of the Examiner's rejection and allowance of claims 7-9, 14, 15 and 19.

The Examiner rejected claims 16, 17, 20, 22, 26 and 27 under 35 U.S.C. 103(a) as being unpatentable over Wirth et al. in view of Vavrek et al. (U.S. Pat. No. 5,311,135). As discussed above, all of the independent claims are believed to be allowable over the Wirth et al. reference. The Vavrek et al. reference does nothing to obviate the deficiencies of the Wirth et al. reference with regard to the parallel circuits used to continuously supply current between an amplifier and a gradient coil or, more generally, between a source and a load. Accordingly, all of the cited dependent claims are believed to be patentable for the subject matter they separately recite as well as by virtue of their dependency on an allowable base claim. Accordingly, Applicants respectfully request withdrawal of the Examiner's rejection and allowance of claims 16, 17, 20, 22, 26, and 27.

Conclusion

In view of the remarks and amendments set forth above, Applicants respectfully request allowance of the claims 1-3, 5-23 and 25-28. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Attachment

Attached hereto is a clean version of the changes made to the claims by the current amendment. The attached page is captioned "**CLEAN VERSION TO SHOW CHANGES MADE.**"

General Authorization for Extensions of Time

In accordance with 37 C.F.R. § 1.136, Applicants hereby provide a general authorization to treat this and any future reply requiring an extension of time as incorporating a request therefor. Furthermore, Applicants authorize the Commissioner to charge the appropriate fee for any extension of time to Deposit Account No. 06-1315; Order No. GEMS:0075/YOD (32-NM-5321).

Date: August 19, 2002

Respectfully submitted,

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CLEAN VERSION TO SHOW CHANGES MADE

IN THE CLAIMS

Please amend claim 1 as set forth below.

B1

1. A switching circuit to linearly conduct current between a source and a load, the circuit comprising:

a switching device coupled between the source and the load, the switching device having a conductive state in which a first portion of the current is conducted between the source and the load during a first phase of operation, the first phase of operation dependent on the magnitude of the current; and

Sub C1

a current steering circuit coupled between the source and the load and in parallel with the switching device, the current steering circuit having a conductive state in which a second portion of the current is conducted between the source and the load during a second phase of operation in which the magnitude of the current is below a non-zero threshold value.